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POULTRY SLAUGHTER

Concerns & Controls

Salmonella
Post-Harvest Meeting

February 23-24, 2006

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OVERVIEW OF SLAUGHTER SYSTEM

- Live Receiving and Hanging (LR)
- Immobilization and Bleeding (IB)
- Scalding (SC)
- Feather Removal (FR)
- Evisceration (EV)
- Chilling (CH)

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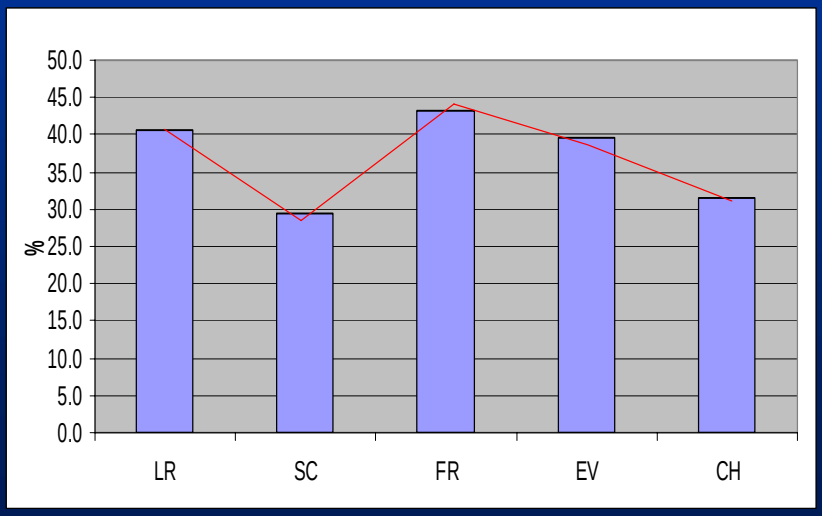
Mean prevalence *Salmonella* spp. by process step



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LIVE RECEIVING AREA

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LIVE RECEIVING CONCERNS

- High level of *Salmonella*
- Incoming load can overwhelm in-plant interventions and is carried forward to subsequent steps
- Feather samples 6.7 log/gram
- Skin samples 5.9 log/gram (Kotula & Pandya, 1995)
- Crop, cecum, colon, cloaca

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LIVE RECEIVING CONTROLS

- Feed withdrawal times
- Coop sanitation
- Unloading & holding area sanitation
- Holding times & litter ingestion
- Employee traffic patterns & facilities
- Air flow from live hang into plant

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STUNNING & BLEEDING

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IMMOBILIZATION & BLEEDING CONCERNS

- Immobilization causes voiding of feces and further contamination of carcass
- Volume of excreta increased as feed withdrawal time increased, e.g. shorter withdrawal times = lower % of broilers produced an excretion (Papa and Dickens 1989)
- Contamination carried forward to scalder and picker

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SCALDER

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SCALDING CONCERNS

- Washes much of the dirt & feces off, more microorganisms removed during scalding than any other step but affect scald water
- *Salmonella & Campylobacter* most common organisms identified, isolated from 75-100% of skin & feather samples
- Microorganisms accumulate over shift, creating source of cross-contamination

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SCALDING CONTROLS

- Brush systems, rinses before scalder
- Counter-current flow, multi-tank systems
- Temperature
- pH
- Sufficient water replacement
- Decrease organic material

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BIRD SCRUBBER

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FEATHER REMOVAL

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FEATHER REMOVAL CONCERNS

- *Salmonella* & *Campylobacter,* up to 100% incidence *Salmonella*
- Picking fingers & feather follicle implicated most often as cross-contamination, and may drive *Salmonella* into follicle
- Cloaca emptied by action of picking fingers, increases contamination

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FEATHER REMOVAL CONTROLS

- NCC GMP's recommend preventing feather build-up, continuous rinses for equipment & carcasses, and equipment adjustments to minimize cross-contamination
- Other interventions include post feather removal 160° F rinses, chlorine rinses, acetic acid rinses, H_2O_2 rinses, & adjuvants with mixed results

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CROP REMOVAL

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EVISCERATION CONCERNS

- Greatest percentage of *Salmonella* recovered from crop, recovered from ceca also
- Highest incidence of carcass contamination occurs pre and post-crop removal due to crop rupture & spillage

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EVISCERATION CONCERNS

- Byrd, Hargis et al 2002 recovered marker organisms placed in broiler crops prior to live hang
  - **92% pre-crop removal**
  - **94% post-crop removal**
- GI leakage from equipment manipulation contaminates both carcass & equipment

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EVISCERATION CONTROLS

- NCC GMP's
- Carcass rinses decrease *C. jejuni*, *Enterobacteriaceae*, coliforms, *E. coli*
- 36.5% decrease in Salmonella when rinses used compared to 20.5% without, not effective against attached pathogens

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On-Line Reprocessing & *Salmonella*

- 23 ppm *FA chlorine ↓ incidence from 5% to 2%
- 10% TSP ↓ 1.36 log10
- 5% cetylpyridinium chloride ↓ 1.62 log10
- 2% lactic acid ↓ 1.21 log10
- 5% sodium bisulfate ↓ 1.47 log10
- 10% TSP & 25 ppm FA CL ↓ 1.44 log10
- Not effective against tightly attached pathogens

*Free Available (FA)

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IMMERSION CHILLER

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CHILLING CONCERNS

- Lipids are 84-98% of filterable solids in the chiller, consume available chlorine, & protect microorganisms
- Chiller is major site for cross-contamination between + & - flocks, can ↑ incidence by 20.7% on average
- Salmonella-negative broilers remain negative if not preceded by Salmonella-positive flocks in the chiller

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CHILLING CONTROLS

- NCC – Proper water replacement, quality, and temperature
- pH 6.5 to 7.5, Free Available Chlorine 1-5 ppm at overflow (Waldroup), minimize organic solids through high flow rate, counter-current direction, cleanliness

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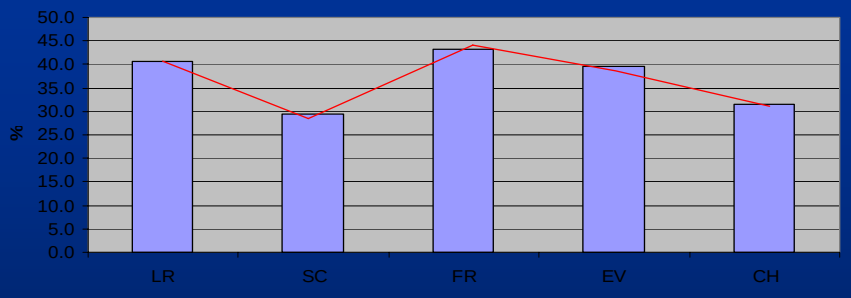

- The appropriate interventions applied effectively can decrease *Salmonella* in the slaughter process.

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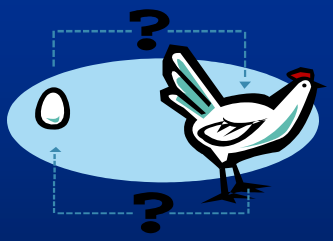
QUESTIONS?



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